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Seasonal Variations in Industrial Wastewater's Impact on the Environment

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ABSTRACT

Water pollution has risen significantly in the current environment as a result of a high degree of industrialization and the fast expansion of industry, particularly contamination of water by industrial waste. For this study, effluent samples were taken at several Before Sanganer, Sanganer, and Post Sanganer sampling sites, and a comparative analysis of the Pre monsoon, monsoon, and post monsoon seasons was conducted. Several physico-chemical characteristics were examined in the samples that were gathered. This was done to determine the main contaminants and how they affected the water's quality. Temperature, pH, Electrical Conductivity (EC), Dissolved Oxygen (DO), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Total Hardness, Acidity, and Heavy Metals like Lead, Chromium, and Arsenic were some parameters that provided evidence of pollution due to industrial effluent discharge. The results clearly show that the value of most of the parameters is higher for the pre monsoon.

KEYWORDS: *Industrialisation, Industrial Effluents, Water pollution, Sanganer, Physico- chemical parameters*

INTRODUCTION

Urbanization and industrialization cause significant amounts of industrial waste water to be produced. Hazardous compounds, such as leftovers from reactive dyes, bleaching agents, and several other organic and inorganic elements, are frequently found in the waste water from various businesses. In India, a significant volume of water is becoming contaminated as a resultof industrial effluents being dumped into the nearby water bodies. The physicochemical parameters of waste water, such as pH, electrical conductivity, total dissolved solids, alkalinity, acidity, dissolved oxygen, hardness, etc., are used to assess the water quality. When these enterprises' waste water is dumped into nearby bodies of water, it seeps into the groundwater and poses a serious danger to the quality of that water. Examining the role that various businesses' effluents have in water pollution, learning more about them, and contrasting the effluent water's quality throughout the pre-monsoon, monsoon, and post-monsoon seasons arethe goals of this work.

MATERIALS AND METHODS

At the various sampling sites, water samples were taken. For the purpose of collecting samples, six locations were chosen. The samples were kept in sterile, clean vials that were kept in a cool environment. This sample was carried out during all three monsoon seasons—pre, during, and post—and was examined for a number of physico-chemical factors, including the presence ofheavy metals. The tools utilised to measure pH, electrical conductivity, nitrate, sulphate, sodium, potassium, and phosphorus were pH metres, digital conductivity metres, spectrophotometers, and digital flame photometers. Nuclear Absorption The concentration of heavy metals was determined using a spectrophotometer. Although total dissolved solids and total suspended solids were evaluated using gravimetric techniques, titrimetric methods were utilised to assess chloride, alkalinity, hardness, dissolved oxygen, and chemical oxygendemand.

RESULTS

According to the tables, the pH ranged from 7.9 in the pre-monsoon season to 8.3 in the monsoon to 8.1 in the post-monsoon season in one of the sample areas, from 7.1 to 7.5 in another, and from 7.5 to 7.8 in a third. With a few exceptions, it is discovered that the pH valueis falling in the majority of samples. We may use pH to assess a water's acidity and basicity. All of the locations' pH values fell below the permitted threshold. From 1182 mho/cm in the pre-monsoon season to 1105 mho/cm in the monsoon, to 1142 mho/cm in the post-monsoon season, the electrical conductivity value varied. Pre-monsoon values at one location range from1840 mho/cm to 1724 mho/cm to 1789 mho/cm in the monsoon season, whereas pre-monsoon values at another site range from 1640 mho/cm to 1548 mho/cm to 1611 mho/cm in the monsoon season. Since water dilutes the ionic concentration and value decreases throughout the monsoon and post monsoon periods, it is noticed that the value of conductivity is higher during the pre-monsoon season in all places. Total dissolved solids in the area ranged from 800 mg/L during pre-monsoon to 590 mg/L during monsoon to 720 mg/L during post-monsoon season, while in other areas, the values ranged from 1270 mg/L during pre-monsoon to 1155 mg/L during monsoon to 1224 mg/L during post-monsoon season, and from 1010 mg/L during pre-monsoon to 1002.

Table 1: Physicochemical parameters in Sample Area

Parameters	Pre Monsoon		Monsoon		Post Monsoon	
	Site 1	Site2	Site1	Site2	Site1	Site2
pH	7.8	7.9	8.1	8.3	8.0	8.1
EC(µmho/cm)	1176	1182	1092	1105	1135	1142
TDS	790	800	630	590	700	720
Chloride	250	255	240	235	243	249
Hardness	256	260	230	240	245	250
COD	154.2	162.3	132.5	147.7	137.5	140.4
DO	0.0	0.0	0.3	0.2	0.0 0.0	0.0
Fluoride	0.8	0.9	0.9	1.1	1.1	1.1
Nitrate	70	73	60	61	65	67
Sulphate	90	95	86	88	88	89
Calcium	45	48	36	39	41	43
Magnesium	37	37	32	33	34	34
Iron	1.8	1.9	1.3	1.5	1.6	1.7
Chromium	0.10	0.11	0.06	0.08	0.09	0.11
copper	0.12	0.12	0.07	0.08	0.09	0.11
Potassium	8	9	5	6	7	8
Sodium	150	170	130	140	140	150

CONCLUSION

The results of a physical-chemical study of effluent samples taken from the chosen regions during the pre-monsoon, monsoon, and post-monsoon seasons revealed that all of the parameters had higher values during the pre-monsoon season in each of the three regions. Thisis due to the fact that all ions and elements have their highest concentrations in the summer, but during the monsoon season, the rain dilutes the composition of the water body and causes all parameter values to decline.

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